REMARKS

This paper is being provided in response to the Office Action dated April 4, 2008, for the above-referenced application. In this response, Applicants have amended claims 1, 15, 21 and 32 to clarify that which Applicants consider to be the presently-claimed invention. Further, Applicants have amended the specification for purposes of clarification. Applicants respectfully submit that the amendments to the claims are fully supported by the originally-filed specification and submit that the amendments to the specification do not add new subject matter.

Concerning the objection to the summary of the invention, Applicants have amended the summary as noted herein. Applicants submit that the summary describes "the invention to which the claims are directed," as required under 37 C.F.R. 1.73 and MPEP 608.01(d). Applicants submit that the rejection should be withdrawn.

The rejection of claims 15-20 under 35 U.S.C. 101 as being non-statutory subject matter is hereby traversed and reconsideration is respectfully requested in view of the amendments to the claims contained herein. Claim 15, as amended, recites computer software, stored on a computer-readable medium accessible by a processor, and, accordingly, recites patentable subject matter in accordance with the guidelines on this issue set forth in MPEP 2106(IV)(B)(1) and the guidelines set forth in the Office Action. Accordingly, Applicants request that this rejection be reconsidered and withdrawn.

The rejection of claims 1-2, 9-11, 14-17, 20-21, 26, 32 and 34 under 35 U.S.C. 103(a) as being anticipated by U.S. Patent No. 7,047,355 to Nakatani, et al. (hereinafter "Nakatani") in view of U.S. Patent No. 6,510,986 to Akutsu, et al. (hereinafter "Akutsu") is hereby traversed

and reconsideration is respectfully requested in view of the amendments to the claims contained herein.

Independent claim 1, as amended herein, recites a method of handling writing new data. The method includes creating a journal entry that points to a first storage location containing old data to be replaced by the data new data. The journal entry is maintained after writing the new data. New storage space is allocated having a second storage location. The new data is written to the new storage space at the second storage location. The old data is maintained in the first storage location after writing the new data to the new storage space at the second storage location The journal entry pointing to the first storage location containing the old data provides a restoration state corresponding to the old data, wherein the restoration state is accessible after writing the new data, and wherein the new data and subsequent new data are kept from overwriting the old data corresponding to the journal entry. Claims 2-14 depend directly or indirectly from independent claim 1.

Independent claim 15, as amended herein, recites computer software, stored on a computer-readable medium accessible by a processor, that handles writing new data. The software includes executable code that creates a journal entry that points to a first storage location containing old data to be replaced by the new data. The journal entry is maintained after writing the new data. Executable code allocates new storage space having a second storage location. Executable code writes the new data to the new storage space at the second storage location. The old data is maintained in the first storage location after writing the new data to the new storage space at the second storage location. The journal entry pointing to the first storage

location containing the old data provides a restoration state corresponding to the old data, wherein the restoration state is accessible after writing the new data, and wherein the new data and subsequent new data are kept from overwriting the old data corresponding to the journal entry. Claims 16-20 depend directly or indirectly from independent claim 15.

Independent claim 21, as amended herein, recites a method of restoring data to a storage device. The method includes accessing a journal having a plurality of entries. Each of the entries points to prior data that existed on the storage device before a write caused the entry to be created. An entry in the journal is created for each data write to the storage device that occurred after an initial time. The prior data corresponding to each of the plurality of entries in the journal is maintained in the storage device after each new data write after the initial time. Each entry pointing to prior data provides a restoration state corresponding to the prior data, wherein the restoration state is accessible after writing the new data, and wherein the new data and subsequent new data are kept from overwriting the prior data corresponding to each entry. At least one of the entries is used to remap the storage device to point to the prior data. Claims 22-27 depend directly or indirectly from independent claim 21.

Independent claim 32, as amended herein, recites a journal used for continuous backup of a storage device. The journal includes a first entry that points to a first storage location containing old data replaced by new data written to the storage device. A plurality of additional entries point to respective additional storage locations containing old data replaced by new data written to the storage device. For every write to the storage device that occurs after an initial time, there is a corresponding entry. The old data corresponding to the first entry and each of the

plurality of additional entries is maintained in the storage device after each new write to the storage device after the initial time. Each of the entries pointing to the storage locations containing the old data provides a restoration state corresponding to the old data, wherein the restoration state is accessible after writing the new data, and wherein the new data and subsequent new data are kept from overwriting the old data corresponding to each of the entries. Claims 33 and 34 depend directly from independent claim 32.

The Nakatani reference discloses an updated data write method using a journal log. Nakatani discloses that a server, including a buffer memory, and a storage system write journal logs and execute flush processing. Nakatani discloses that a journal log is provided to separately store a file update history in the storage system because the contents of data updating executed in the buffer memory of the server may be lost because of a failure before data is updated in the storage area in the storage system. (See col. 7, lines 39-45 of Nakatani.) The Office Action cites to col. 6, lines 4-27 of Nakatani in which is disclosed the use of pointers to manage the status of a journal log storing area after flush processing. The Office Action states that Nakatani does not disclose maintaining journal entries after writing new data.

The Akutsu reference discloses a transaction record storing device and transaction machine. The Office Action cites to Akutsu as disclosing maintaining a journal entry after writing new data, citing specifically to Fig. 7, col. 4, lines 54-59 and col. 14, lines 56-65 of Akutsu.

Applicants recite a system for managing data writes that include a journal that keeps track of all of the old data storage areas corresponding to each write of new data to a storage device. Applicants refer to FIGS. 5, 6 and 7 of the originally-filed specification in which is shown a series of new writes to a storage device and the corresponding use of journal entries to keep track of the locations of old data in the storage device. Accordingly, Applicants' presently-claimed invention provides a method and device for continuous data backup in which a storage device can easily be restored to an earlier state through the use of maintained journal entries and stored old data that is maintained in the storage device. Applicants note that logical devices, used in connection with the journal entries may be used to keep new data from being written over old data corresponding to journal entries. For example, in connection with a write operation to an area of the logical storage device that initially pointed to the storage area, a new storage area may be allocated on a new storage device and the logical storage device mapped to the new storage area. A new entry is provided to the journal where the new entry points to the storage area previously pointed to by the section of the local storage device. (See, for example, page 14, line 8 to page 15, line 4 of the originally-filed specification.)

The Office Action cites to Figures 4 and 6, col. 8, lines 30-34 and col. 9, lines 61-65 of Nakatani as disclosing "writing the new data to the new storage space at the second location, wherein the old data is maintained in the first storage location after writing the new data to the new storage space at the second storage location." However, these portions of Nakatani disclose allocation of an area of a required size for a journal log area and then incrementing an end pointer in a buffer memory by the size of the allocated area. Nakatani discloses using data in the journal logs to execute flush processing in which updated data is read from the journal log

storing area into a cache. (See Col. 5, lines 6-13 of Nakatani). Nakatani specifically discloses that

> When the server 1 receives the flush processing completion notification from the storage system 2, the file system manager 12 dequeues the dirty data, which is stored in the buffer memory of the server 1, from the dirty queue. As a result, the storage area in the buffer memory 13 where the dirty data has been stored is released for use in storing other data. (Col. 5, lines 38-44 of Nakatani)

Nakatani 's journal log is disclosed as being provided for new data written to a buffer memory of a storage device before being written to a storage system. Nakatani states:

> The journal log is provided to separately store a file update history in the storage system 2 because the contents of data updating executed in the buffer memory 13 of the server 1 may be lost because of a failure before data is updated in the storage area in the storage system 2. *Therefore, the journal log is not necessary once data is updated in the storage area of the storage system 2.* (Col. 7, lines 39-45 of Nakatani.) (emphasis added)

Nakatani discloses a journal log system in which new updated data that is to be written to a storage system is first stored in a buffer memory in storage locations that are logged into a journal. That is, the journal log disclosed by Nakatani is for ensuring the correct writing of new data to a storage device in the event of a failure before the new data is updated in the storage area.

Accordingly, Applicants submit that Nakatani does not disclose maintaining old data in a first storage location after writing of new data to a new storage space at a second storage location as is claimed by Applicants.

Further, the Office Action states that Nakatani does not disclose maintaining journal entries and then cites to Akutsu as disclosing that a journal entry is maintained after writing new

data, citing specifically to Fig. 7, col. 4, lines 54-49 and col. 14, lines 56-65 of Akutsu. As further discussed below, Applicants submit that Akutsu does not disclose maintaining a journal entry after writing the new data, wherein the journal entry pointing to the first storage location containing the old data provides a restoration state corresponding to the old data, wherein the restoration state is accessible after writing the new data, and wherein the new data and subsequent new data are kept from overwriting the old data corresponding to the journal entry. However, before addressing Akutsu, Applicants point out that, as noted above, Nakatani's disclosure explicitly states that: "Therefore, the journal log is not necessary once data is updated in the storage area of the storage system." (Col. 7, lines 39-45 of Nakatani.) Nakatani's system explicitly teaches away from the concept of a journal log as providing a restoration state for restoring a storage device to a state corresponding to old data. Instead, Nakatani's system provides for deleting a journal log once data has been written to a storage system, and may therefore be flushed from buffer memory. Applicants submits that nothing in Nakatani would lead one of ordinary skill in the art to look for a teaching of maintaining a journal entry to restore a storage device to a state corresponding to old data. Indeed, Nakatani's device explicitly provides for the release from storage space of "dirty data." Accordingly, Applicants submits that the proposed combination of Nakatani with Akutsu to attempt to replicate the features of the Applicants' presently-claimed invention is not supported by Nakatani, and instead is explicitly taught away from by Nakatani.

Turning now to the citation of Akutsu, Applicants respectfully submits that, even if combined with Nakatani, Akutsu does not overcome the above-noted deficiencies of Nakatani with respect to Applicants' presently-claimed invention. The Office Action cites to Akutsu

discloses maintaining electronic journal data subjected to writing in a buffer means; however, Akutsu states: "On the other hand, when the writing into the storage medium is successful (i.e. when the storage amount in the storage medium reaches the predetermined value), *an area in the buffer means storing the electronic journal data subjected to the writing is released to allow new electronic journal data to be overwritten in that area.*" (emphasis added) (See col. 5, lines 3-9 of Akutsu.) Accordingly, Applicants submit that Akutsu does not provide for maintaining journal entries to provide for a restoration state corresponding to a state of old data, and specifically, does not disclose maintaining a journal entry after writing the new data, wherein the journal entry pointing to the first storage location containing the old data provides a restoration state corresponding to the old data, wherein the restoration state is accessible after writing the new data, and wherein the new data and subsequent new data are kept from overwriting the old data corresponding to the journal entry, as recited by Applicants.

Accordingly, Applicants respectfully submit that neither Nakatani nor Akutsu, taken alone or in any combination, teach or fairly suggest at least the above-noted features as claimed by Applicants. In view of the above, Applicants respectfully request that the rejection be reconsidered and withdrawn.

The rejection of claims 3-8, 12-13, 18-19, 22-25, 27 and 33 under 35 U.S.C. 103(a) as being unpatentable over Nakatani in view of Akutsu and further in view of U.S. Patent No. 7,013,379 to Testardi (hereinafter "Testardi") is hereby traversed and reconsideration is respectfully requested.

The features of independent claims 1, 15, 21 and 32 are discussed above with respect to Nakatani and Akutsu. Claims 3-8, 12-13, 18-19, 22-25, 27 and 33 depend therefrom.

The Testardi reference discloses techniques in a computer system for handling data operations to storage devices. The Office Action cites to Testardi as disclosing the use of a switch that handles data operations to a storage device.

Applicants respectfully submit that Testardi does not overcome the above-noted deficiencies of Nakatani and Akutsu with respect to Applicants' claimed invention. The Office Action cites to Testardi for the use of a switch, but Testardi does not disclose, and is not cited in relation to, the features discussed above of Applicants' presently-claimed invention. Accordingly, Applicants submit that neither Nakatani, Akutsu nor Testardi, taken alone or in any combination, teach or fairly suggest at least the above-noted features as claimed by Applicants. In view of the above, Applicants respectfully request that the rejection be reconsidered and withdrawn.

Based on the above, applicant respectfully requests that the Examiner reconsider and withdraw all outstanding rejections and objections. Favorable consideration and allowance are earnestly solicited. Should there be any questions after reviewing this paper, the Examiner is invited to contact the undersigned at 508-898-8603.

Respectfully submitted,
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